EP 63-10

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25X1A

11 December 1963

MEMORANDUM FOR: [redacted]

SUBJECT: Transmittal of ORR Project 40.4255 and Intelligence Memorandum dated 22 October 1963

Attached are four copies each of two studies recently prepared by this office for use in the appraisal of Cuban economic vulnerabilities. Additional copies of this study have been made available to other components of the Agency and to the Department of State.

Will you please see that two copies of this report are furnished the Enforcement Division of the Department of Commerce and that two copies are made available to the Office of Export Control. The latter two should be for [redacted]

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[redacted]
Chief, International Division

Enclosure:
As stated above.

Distribution:
Original and 1 - Addressee
1 - St/P/C
1 - D/I
25X1A 2 - I/LA

ORR/I/LA: [redacted] mab/5418 (11 Dec 63)

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Approved For Release 2000/05/15 : CIA-RDP79T01049A002900060001-3

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11 December 1963

MEMORANDUM FOR: Chief, Enforcement Division,
Department of Commerce

SUBJECT: Transmittal of Intelligence Studies on Cuban Economic Situation

1. Attached for your information and use on the Cuban problem are two studies prepared by this Office. The principal study, titled An Appraisal of Cuban Economic Vulnerabilities, is a working paper which represents our assessment of the situation just prior to Hurricane Flora. The memorandum, titled Interim Assessment of Hurricane Damage in Cuba, sets forth our best judgement as to the extent and magnitude of physical damage and attempts a tentative assessment of the hurricane's probable impact upon the overall Cuban economic situation.

2. As the memorandum indicates, we believe that Flora has produced a serious setback to Cuban agriculture, and has diminished the Castro regime's opportunity to take advantage of high sugar prices in the world market. Likewise, diversion of manpower, machinery, and equipment to disaster recovery operations will adversely affect the amount of new capital formation possible in the next year or so.

3. Obviously, Flora's impact will have to be kept in mind when reading or utilizing our earlier study on Cuban economic vulnerabilities, especially with respect to our earlier forecast of an upturn in the physical volume of production and exports of sugar in 1964. After reviewing the earlier study in the light of Flora, however, we do not believe that the hurricane alters its principal judgements with respect to (a) the broad question of economic denial and (b) the general situation prevailing in the most important production branches of the Cuban economy. Therefore, because of your expressed urgent need for information on the Cuban economy which will assist you in the formulation of plans and policies, we are transmitting to you our working paper on Cuban economic vulnerabilities without benefit of up-dating.

SECRET

4. Additional copies of these studies have been made available to other components of this Agency and to the Department of Commerce.

25X1A

[redacted]
Chief, International Division

Enclosures:
1. An Appraisal of Cuban Economic Vulnerabilities
2. Interim Assessment of Hurricane Damage in Cuba

Distribution:
Original and 1 - Addressee
1 - St/P/C
1 - D/I
25X1A 2 - I/IA

ORR/I/IA [redacted] :mab/5418 (11 Dec 63)

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25X1A

Chief, [redacted] 19 September 1963

Chief, I/LA, ORR

Study Appraising Cuban Economic Vulnerabilities

REF : Request for Subject Study Contained in [redacted] August 1963

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1. Attached are two draft copies of an ORR study appraising
25X1A Cuban economic vulnerabilities, prepared at the request of Mr. [redacted]

2. The study is in two principal parts. The first part presents a brief survey of broad trends in the Cuban economy; provides some quantitative measures of Bloc economic assistance to Cuba; sets forth some generalized weaknesses and strengths in Cuba's economic posture; and offers certain comments concerning the prospects for economic denial operations against Cuba. The second part, representing the bulk of the study, consists of a series of appendix discussions, each of which addresses itself to the specific situation within a given major sector of the Cuban economy.

25X1A

3. Should the study identify any specific areas of interest, concerning which [redacted] would consider it useful to have further amplification or clarification, we will be happy to assist in any way possible.

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[redacted]

Enclosure: As stated above

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GROUP 1
Excluded from automatic downgrading and declassification

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AN APPRAISAL OF CUBAN ECONOMIC VULNERABILITIES

CIA/RR

(ORR Project No. 80.4255)

19 September 1963

CENTRAL INTELLIGENCE AGENCY

Office of Research and Reports

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Contents

Summary and Conclusions

Broad Economic Trends in Cuba

Between 1958 and 1962, total gross output in Cuba may have fallen by one-quarter and total personal consumption probably dropped by one-fifth. Steeper declines were avoided by an influx of Bloc assistance which in 1962 enabled Cuba to import goods valued at $760 million (10 percent lower than in 1958) even though export earnings declined to $520 million (30 percent lower than in 1958).

The economy will almost certainly register a further decline in total output during 1963. Production of sugar -- typically accounting for 20 percent of total national output -- is down 20 percent from 1962, and there is no convincing evidence of compensating gains in other production sectors.

The Economic Burden of Cuba to the Bloc

From 1960 through 1962, net out-of-pocket costs to the Bloc for economic assistance to Cuba amounted to an estimated $490 million: $440 million in balance of payments support and $50 million in Cuban drawings against Bloc development loans. The share of the USSR in all of these outlays amounted to approximately $400 million, or 85 percent of the total.

Cuban drawings against Bloc economic development credits have accelerated since 1962. It is unlikely, however, that more than one-quarter of the almost $500 million extended will have been utilized by the end of 1963.

At year-end 1962, Cuba ranked fifth among the 31 underdeveloped countries to whom economic assistance has been extended by the Bloc since

1954. In the years 1960-62 alone (that is, the period during which Bloc aid to Cuba first assumed significance), Cuba accounted for 17 percent of all Bloc development credits and grants extended, and for 20 percent in the case of corresponding extensions by the USSR alone. In terms of actual drawings during 1960-62 against economic development loans from the Bloc as a whole or from the USSR alone, Cuba's share in neither case exceeded 7 percent. When, however, Bloc outlays for economic assistance to underdeveloped areas in 1960-62 are adjusted to reflect balance of payments expenditures as well as drawings on development credits Cuba's share then rises to 35-40 percent of the total.

Weaknesses and Strengths in the Cuban Economic Picture

A basic problem for Cuba is the fact that it is a tropical island with a lopsided economy. It has traditionally concentrated on the production and export of sugar to finance the import of almost all its capital equipment, most of its industrial raw materials, and much of its manufactured consumer goods and foodstuffs. Cuba's insularity was not a major problem as long as its foreign trade lifeline with nearby US markets and sources of supply remained intact. Since reorientation to the Bloc, however, the necessity of carrying on the bulk of its foreign trade over multithousand mile seelanes imposes on Cuba a serious and continuing economic disability.

The Castro regime now is vexed by the fact that virtually all of Cuba's capital plant was manufactured and installed by Free World suppliers,

principally the US. Cuba's ability to obtain replacement units and spare parts for this equipment has been seriously impaired by the US unilateral embargo. Cuba can procure a wide range of necessary parts, equipment, and materials from other Free World countries, but its ability to do so has been limited by reduced earnings of convertible foreign exchange.

A major affliction of the Cuban economy has been the Castro regime itself. Under Castro, Cuba has been subjected to an almost incredible degree of economic mismanagement, extending from grandiose and unrealistic central planning by pseudo-economists down to local supervision of farms and factories by unqualified political opportunists.

Despite glaring weaknesses, the strength of Castro's position in dealing with the economic situation should not be underestimated. Cuba has a benign climate, and thus is posed with relatively minimal requirements for clothing and shelter. It enjoys a favorable ratio of population to agricultural resources and, under almost any circumstances, would be able to feed itself. Castro possesses a loyal body of military and security forces adequate to control the population in the absence of a large-scale armed invasion. The volume of Bloc economic assistance to Cuba is substantial. Finally, it is likely that 1964 will see an upturn in Cuban sugar production and exports.

Prospects for Economic Denial Operations Against Cuba

US economic denial operations against Cuba cannot force the economy to grind to a halt and are unlikely to seriously affect its general level of operation.

Even under conditions of a full naval blockade, the island could feed itself at some subsistence level. At present, imports required to assure functioning of the economy at something considerably better than a subsistence level are being provided by the Bloc. Many items badly needed by Cuba and not readily available directly from the Bloc can be purchased from non-Bloc suppliers for hard currency. Despite reduced export receipts, Cuban purchases from Free World areas exceeded $100 million 1962 and many approach that figure again in 1963.

Except for petroleum, no item imported by Cuba has been identified as a true "economic bottleneck", that is, an item for which there is no adequate substitute and the lack of which would cause a pervasive disruption of the economy.

Successful denial of certain goods and commodities (identified in the sector analyses appended) could produce certain limited results by injecting additional irritants and costs into the running of the Cuban economy. Effective interdiction of such items could result in temporary curtailment or shutdown of production at important Cuban facilities. Castro's procurement agents could be forced to roam far afield and to deal with sub-rosa suppliers, a costly and time-consuming process sometimes resulting in excessive down-time at a given Cuban facility. Finally, the

increasingly coercive trend of regime measures in the labor field may provide raw material for stepped propaganda efforts highlighting real or latent schisms between Castroist economic policies and the material aspirations of the Cuban population.

Situation in Major Economic Branches

All major branches of the Cuban economy are suffering from shortages of high-quality spare parts, replacement units, and materials.

In the petroleum industry, high levels of output have been maintained. Refining capacity is in danger of progressive reduction, however, as a result of poor maintenance, the use of inferior substitute parts, and the use of crude oil different from that for which the refineries were originally designed. Should this occur, there is the possibility that Cuba could obtain increased supplies of finished petroleum products from the USSR, Egypt, or other Free World countries.

On an aggregative basis, the electric power industry has been maintaining output at high levels, but shortages of spare parts and materials has resulted in numerous temporary outages. The Bloc is constructing new power plants in Cuba and has supplied the island with several hundred small diesel generators, but has not supplied any significant amount of replacement parts for existing equipment. To obtain such replacements, Cuba has cultivated some apparently fruitful contacts in France, Canada, and the UK.

The chemical and rubber industry is now relatively larger than in the pre-Castro period. Its contribution to total manufacturing is about the same as before, however, because shortages of materials, machinery, and instrumentation prevent operation of production facilities at full capacity.

Through expansion of operations at the almost new Moa Bay installation, the Cuban nickel industry succeeded in expanding output by 1962 to a level somewhat higher than in the pre-Castro period. The industry is still operating at only half its rated capacity, however; further expansion is impeded by the difficulty of procuring a wide range of highly specialized parts and materials.

Operating efficiency in the railroad system probably has decreased by more than 20 percent since 1959. Perhaps 35 percent of all diesel locomotives are inoperable from lack of spare parts and proper maintenance. For similar reasons, the Cuban inventory of operable buses and automobiles has dropped sharply, but truck transport capabilities have been shored up by the delivery of at least 15,000 trucks from the USSR.

The telecommunications industry appears to have maintained microwave relay, telegraph, and broadcasting services reasonably well. Planned expansion has not materialized, however, owing to delays in the scheduled delivery and installation of Bloc equipment. Of all telecommunications services, the telephone system appears to be encountering the most serious problems.

Agriculture currently is receiving major emphasis. Although a key effort is underway to expand cane acreage, general policy now stresses intensive rather than extensive methods in agricultural production. For achievement of these goals -- involving greater use of machinery, fertilizers, and irrigation -- Cuba has obtained substantial Bloc commitments for material and technical assistance. In the interim, Cuban agricultural progress is impeded by a severe shortage of labor. The wide gap between plans and achievements in Cuban agriculture is being mitigated in part by Bloc deliveries of essential foodstuffs.

An Appraisal of Cuban Economic Vulnerabilities

I. Introduction: Purpose and Scope

The principal aims of this study are to examine the question of vulnerabilities in the most important sectors of the Cuban economy and to identify sensitive points within the structure of Cuba's import and export requirements. To facilitate a balanced overview, the study begins with a brief survey of broad trends in the Cuban economy and some rough measures of the economic assistance rendered to Cuba by the Bloc. The study next turns to a generalized discussion not only of weaknesses but also of strengths inherent in Cuba's economic posture and also offers certain comments concerning the prospects for economic denial operations conducted against Cuba. Following this, and constituting the bulk of the study, is a series of appendix discussions, each of which addresses itself to the specific situation within a given major sector of the Cuban economy.

II. Broad Trends in the Cuban Economy

Between 1959-1962 the Cuban economy contracted sharply and there is virtually no prospect for a reversal of the downward trend during the current year.

Rough estimates indicate that by 1962 the total output of the Cuban economy may have fallen by as much as one-quarter below the level of 1958. Total personal consumption during the same period probably dropped by not less than one-fifth. These declines undoubtedly would have been steeper

except for Bloc assistance which -- as illustrated below -- enabled Cuba to maintain a relatively high level of imports despite a sizable reduction in export earnings.

(in millions of $US)

	1958	1959	1960	1961	1962
Total Cuban Exports	735	640	620	625	520
of which, to Bloc	15	15	150	480	400
Total Cuban Imports	850	750	556	704	760
of which, from Bloc	negl.	negl.	126	511	645

It is virtually certain that the Cuban economy will register a further decline in total output during 1963. Production of sugar - typically accounting for about 20 percent of total output in Cuba -- is down 20 percent from the 1962 level and there is no convincing evidence of gains in other production sectors adequate to offset the downturn in sugar. Although the Bloc -- principally the USSR -- has agreed to provide Cuba with balance of payments assistance again in 1963, available evidence indicates that total Cuban imports from the Bloc in the current year are unlikely to exceed the 1962 level.

The political effects of economic decline have been mitigated in some degree by a more even distribution of the smaller volume of goods and services available. Further, Castro has made effective use of propaganda which stresses that, material hardships notwithstanding, the revolution has given to the Cuban worker and peasant a degree of social justice, dignidad,

and educational opportunity never before available to him. Despite these palliatives, however, dissatisfaction with living conditions has given rise in Cuba to widespread worker apathy and absenteeism which, unless dissipated, operate as serious impediments to economic recovery.

III. The Economic Burden of Cuba to the Bloc

A. Net Estimates, 1960-62

We estimate that, during the three-year period 1960-62, the net out-of-pocket cost to the Bloc of economic assistance rendered to Cuba amounted to approximately $490 million. Although inclusion of additional assistance supplied in 1963 would undoubtedly result in a raising of this figure, available data are too fragmentary to permit a forecast.

Bloc economic assistance to Cuba may be summarized under two broad categories: (1) balance of payments assistance and (2) economic development assistance. In terms of the total value of aid formally extended, the economic development category is the larger. In terms of aid actually utilized, however, balance of payments assistance has been by far the most important.

B. Balance of Payments Assistance

The Bloc countries initiated balance of payments support to Cuba early in 1961 when they agreed to pay a premium price for sugar imported from Cuba. Between the beginning of 1961 and the end of 1962, the Bloc purchased sugar from Cuba which, at prevailing world market prices, was

worth about $550 million. The Bloc's buying price of 4 cents a pound was considerably above the world price during most of the 1961-62 period, however, and the Bloc countries actually paid $750 million for their imports of Cuban sugar. Thus Cuba received an indirect balance of payments subsidy of $200 million over the two-year period. It is estimated that almost 65 percent, or approximately $125 million, of this subsidy was absorbed by the USSR.

In addition to the sugar subsidy, the Bloc has also provided substantial balance of payments support to Cuba in the form of commodity credits covering Cuba's accumulated trade deficit with the Communist countries. By the end of 1961, a relatively small imbalance appeared in Cuba's clearing accounts with the Bloc and then mushroomed rapidly in 1962. By the end of 1962, Cuba's aggregate deficit trade balance with the Bloc amounted to about $240 million. Of this total, somewhat more than 85 percent, or approximately $200 million, was covered by commodity credits from the USSR.

C. Economic Development Assistance

In the three-year period 1960-62, the Bloc extended to Cuba a total of $469 million in economic development credits, approximately two-thirds of which was provided by the USSR. In contrast to balance of payments assistance, however, relatively little of the development credits was drawn during this period. Of the nearly $470 million extended, only an estimated

$90 million actually had been utilized by the end of 1962. Of this amount, it is estimated that technical assistance accounted for about $30 million while drawings for machinery and equipment amounted to about $20 million. Although precise estimates cannot be made, available evidence indicates that most of the $90 million drawn by Cuba against the economic development credits has come from the USSR.

D. Developments in 1963

It appears certain that the figure of $490 million representing the net cost of Bloc economic assistance to Cuba will have to be revised upward when the necessary calculations can be made for 1963.

The USSR, Mainland China, and Czechoslovakia -- Cuba's principal Communist trading partners -- have formalized new balance of payments credits to cover an anticipated surplus of exports to Cuba in 1963. Although the new Czech credit is known to amount to $20 million, no information is available on the size of those extended by the USSR and Communist China.

Should the trend of the first half of 1963 continue throughout the year, it is highly likely that Cuban drawings on Bloc economic development credits will show a measurable increase over the total accumulated by year-end 1962. The number of economic technicians present in Cuba during 1963 probably will be considerably higher than the average for 1962 and this will produce a corresponding rise in drawings for technical services. Also, fragmentary evidence covering the early months of 1963 indicated that the

rate of cargo deliveries to various Soviet development projects in Cuba was accelerating over that of 1962. Despite the increased rate of drawings, however, very rough estimates suggest that not more than one-quarter of the Bloc economic development credits will have been utilized by the end of 1963.

IV. Cuba's Share of Bloc Economic Aid

As of the end of 1962, Cuba ranked fifth among the 31 underdeveloped countries to whom economic assistance has been extended by the Bloc since 1954. Cuba's ranking was the same during this period with respect to economic aid extended by the USSR alone. These relationships may be seen in the tabulation following.

(Million current US$)

Recipient	Total Bloc Economic Credits and Grants Extended, 1954-62	Total USSR Economic Credits and Grants Extended, 1954-62
India	982	811
U.A.R.	716	909
Indonesia	638	369
Afghanistan	514	507
Cuba	469	312

In terms of the total amount of economic development assistance extended to underdeveloped countries between 1954-62 by the Bloc ($5.1 billion) and by the USSR alone ($3.6 billion), Cuba's share in both cases was about 9 percent.

If only the years 1960-62 are considered (that is, the period during which Bloc aid to Cuba first assumed significance), Cuba's share then rises

to 17 percent for all Bloc development credits and grants extended, and to 20 percent in the case of extensions by the USSR. In terms of actual drawings during 1960-62 against economic development loans from the Bloc as a whole or from the USSR alone, Cuba's share in neither case exceeded 7 percent.

If one considers, however, the totality of actual Bloc outlays for economic support of underdeveloped countries in the period 1960-62, then Cuba's share rises radically. It will be recalled that, in addition to approximately $50 million in drawings against economic development credits, Cuba obtained from the Bloc about $440 million in balance of payments support between 1960-62; during this same period, many other underdeveloped countries also drew against Bloc development credits but none received any significant balance of payments aid. If a relationship is drawn on this basis, then the net Bloc outlay of about $490 million on Cuba between 1960-62 for economic assistance represents between 35-40 percent of all outlays made by the Bloc during this period on economic aid for underdeveloped areas. A comparison of corresponding outlays made by the USSR alone yields approximately the same percentage range.

V. Weaknesses and Strengths in the Cuban Economic Picture

A. Weaknesses

Many of Cuba's present economic weaknesses are of geographical and historical origin. Geographically, it is a tropical island whose economic

life has been based principally upon the production for export of cane sugar. From this sugar, Cuba acquired about 80 percent of its total foreign exchange earnings. With domestic industry too narrowly based to meet many of its needs, Cuba utilized these foreign exchange earnings to finance the import of almost all of its capital equipment, most of its industrial raw materials, and much of its manufactured consumer goods and foodstuffs.

Its insularity was not a major problem to Cuba as long as the foreign trade lifeline with nearby US markets and sources of supply remained intact. Since transferring both its allegiance and trade to the Communist world, however, the necessity for Cuba to conduct the bulk of its foreign trade over multi-thousand mile sealanes imposes a serious and continuing economic disability. Substantially enlarged transportation charges have increased the costs to Cuba of carrying on its foreign trade, and the last several years have been frequently punctuated by ship-chartering problems, loading and unloading delays, cargo spoilage, and miscellaneous and expensive misunderstandings between Cuban and Bloc trade personnel.

An historical feature of Cuban development which continues to cause vexing problems to the Castro regime is the fact -- referred to above -- that virtually all of Cuba's capital plant was manufactured and installed by Free World suppliers, principally the US. Cuba's ability to obtain replacement units and spare parts for this capital equipment has been

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seriously impaired by the US unilateral embargo. Procurement of US or US-compatible parts and equipment from other Free World countries has become increasingly difficult for Cuba because its earnings of convertible foreign exchange have steadily dwindled. Although largely undeterred by trade control policies, political considerations, or moral suasion, most West European and other Free World suppliers have become reluctant to make deliveries to Cuba for anything except cash on the barrel-head -- a requirement that the Castro regime is not always able to meet.

As a consequence of these problems, industrial facilities and power generating installations have in a number of instances been forced out of operation for varying periods of time as Western-origin machinery and equipment have broken down for lack of spare and replacement parts. Cuba's inventory of motor vehicles and diesel locomotives has been similarly affected.

Apart from the impact of these geographical and historical factors, the decline of economic activity in Cuba can best be laid at the door of the Castro regime itself. Under Castro, Cuba has been subjected to an almost incredible degree of economic mismanagement, extending all the way from grandiose and unrealistic central planning activities by pseudo-economists down to local control and direction of farms and factories by unqualified political opportunists.

In the misguided and premature pursuit of economic diversification, resources were withdrawn from sugar production and cane workers were diverted

into construction, industry, and the raising of other crops. As a result, production of sugar dropped drastically in 1962, export earnings from sugar fell concomitantly, and Castro and his planners realized that a serious mistake had been made. When the regime sought to restore former cane workers to their old backbreaking pursuits, it discovered that those now in construction and industry, finding the work easier and assured of year-round rather than seasonal wages, had no incentive to return to the fields. The subsequent dragooning of thousands of inexperienced "volunteers" to assist in cane harvesting failed to produce the desired results and in 1963 production of sugar again plummeted, this time to the lowest level in decades.

Heightened employment in construction and industry has produced no offsetting gains. The regime has admitted openly that the construction industry is characterized by extremely low productivity. Recent reports indicate that a large number of construction projects have been abandoned or delayed. Evidence also strongly suggests that payrolls in Cuban industry and in the distribution system are heavily burdened with managers and employees who are either marginally productive or, in many cases, counter-productive.

Because the regime appears to be engaged presently in developing a series of measures designed to reduce absenteeism, regulate wages, raise output, and transfer workers into government-designated areas of employment, yet another problem area for the economy is opened up. Workers, many of

whom are already dissatisfied because of consumer goods shortages and other deprivations, are likely to regard these measures as coercive or as work speed-up devices, unaccompanied by any significant new material incentives. The average Cuban is not yet as disciplined to sustained hard work as his Slavic counterpart, and austere labor policies may well augment popular discontent without bringing about the desired increase in productivity.

B. Strengths

Formulation of policies for economic warfare or economic denial operations against Cuba requires an appraisal not only of the island's weaknesses but also of its strengths.

A major element of strength insofar as Castro is concerned is the fact that, under present circumstances and despite the deterioration of the Cuban economic situation, he possesses a loyal body of military and security forces adequate to control the population in the absence of a large-scale military invasion. He derives added strength in controlling the internal situation from the ranks of Cuban youth, whom he has singled out for special material and educational privileges.

Another principal element of strength for Castro is the continuing economic support rendered to Cuba by the USSR and other Bloc countries. It now appears clear that the USSR will not subsidize a "showcase" standard of living nor a grandiose industrialization scheme for Cuba. It is equally evident, on the other hand, that the USSR has been, and remains for the

present at least, willing to provide sufficient petroleum, equipment, raw materials, and food to keep Cuba's economy from deteriorating to the point of general alienation of the people, and so becoming a critical source of danger to Castro.

Apart from economic support rendered from without, it must also be remembered that Cuba enjoys certain intrinsic economic benefits. It has a benign climate, and thus is posed with relatively minimal requirements for clothing and shelter. It enjoys a favorable ratio of population to agricultural resources and, even under the most adverse circumstances, would be able to feed itself if necessary at something better than a subsistence level. This does not imply that Castro's position would be unaffected under such conditions; it does mean, however, that starvation is a very unlikely possibility in Cuba.

A final aspect of strength in the Cuban economic situation is the likelihood that 1964 will see an upturn in sugar production and exports. There is evidence to indicate that, under prodding by the USSR, the Castro government has shelved its elaborate industrialization schemes and is now awarding highest priority to agricultural development, with special emphasis on cane. Although next year's cane harvest in all probability will suffer again from labor shortages and bad management it is estimated that increases in the acreage planted to cane will permit at least a modest increase in sugar production over this year's level of 3.8 million metric tons.

VI. Prospects for Economic Denial Operations Against Cuba

In evaluating the prospects for economic denial operations against Cuba, the principal problem turns on the objectives of such operations. If the objectives are to bring about the collapse of the economy and thereby to overturn Castro, such operations would not appear to be at all promising. If the objectives are modest in scope -- that is, wherever opportunity presents itself, to inject additional irritants and costs into the running of the Cuban economy -- such operations may be expected to produce certain limited results. In the latter case, monetary and political costs to the US will obviously vary with the scope and magnitude of a given operation. The reasoning behind these conclusions is discussed in further detail below.

Neither during World War II nor the postwar period have economic denial operations conducted by the US and its allies brought any economy to its knees or led to the overthrow of any political regime. With respect to trade controls instituted against the Bloc, such controls may have retarded growth in specific branches of production, but there is considerable doubt that such measures have been a major deterrent in the over-all development of Bloc economies. It is, in fact, arguable that trade controls in a number of instances have accelerated the development of relative self-sufficiency within the Bloc economies.

In the case of Cuba, the evidence supports the conclusion that US economic denial operations, even those which might successfully interdict the flow of

various "key" items to Cuba, cannot force the economy to grind to a halt or seriously affect its level of operation. Even under conditions of a full naval blockade, the island could feed itself at some subsistence level. As things actually stand, imports required by Castro to assure continued functioning of the economy at something considerably better than a subsistence level are being provided by the Bloc.

There is, finally, the question of materials, machinery, equipment, and spare parts badly needed by Cuba and not readily obtainable directly from the Bloc. Depending upon decisions by Castro or his Bloc partners to draw against foreign exchange earnings, most of these items (or suitable substitutes) can be purchased from non-Bloc suppliers. Few if any of the items most seriously needed by the Cuban economy are presently included on the COCOM embargo list and prospects for substantially widened coverage aimed against Cuba do not appear bright. From the standpoint of many Free World suppliers, the principal limitation on Cuban procurement is the ability of the Castro government to pay. Although declining export receipts make it manifestly impossible for Cuba to finance procurement of many of the items it desires, Cuban imports from Free World areas nevertheless continued to exceed $100 million in 1962 and will in all probability approach if not exceed that figure again in 1963.

Effective economic interdiction of Cuba requires, first, that the target commodity be unavailable or in significantly short supply in the Bloc and,

secondly, that all Free World countries capable of supplying the commodity cooperate with the US in the denial. As US experience in COCOM negotiations of recent years shows, such cooperation is most difficult to obtain.

With the exception of POL, denial of which would be a powerful disruptive factor in Cuban economic life, we have not identified any item imported by Cuba that can be classified as a true economic "bottleneck"; that is, an item for which there is no adequate substitute and the lack of which would cause a pervasive disruption in the economy.

On the other side of the coin, successful denial to Cuba of certain goods and commodities (as identified in the sector analyses appended) could be expected to produce some limited impacts upon the Cuban economy at given times or at given places. Interdiction of shipment of such items to Cuba could result in the temporary curtailment or shutdown of production at important Cuban facilities. Continued thwarting of Cuban efforts to obtain US or US-compatible equipment forces Castro's procurement agents to range far afield and to deal with sub-rosa suppliers. This is a costly and time-consuming process which sometimes results in excessive down-time at the affected Cuban production facility.

Another potentially exploitable opportunity may lie in stepping up propaganda efforts highlighting real or latent schisms between Castroist economic policies and the material aspirations of the Cuban population. The increasingly coercive trend of Castro's policies in the labor field described earlier in this paper may provide suitable raw material for such an effort.

The following appendices contain a series of appraisals each of which addresses itself to the situation in a major sector of the Cuban economy.

Appendix A

Petroleum Industry

I. Present Situation

a. Supply of Petroleum

For practical purposes, Cuba is entirely dependent on imports for its supply of petroleum. Since mid-1960 the Bloc, principally the USSR, has supplied almost all of Cuba's petroleum. During the first half of 1963 imports of petroleum were at a rate of about 80,000 barrels per day (bpd) and were composed of about 90 percent crude oil and 10 percent products.

b. Refining

Cuba has three principal crude oil refineries, two in Havana and one at Santiago de Cuba, with a total designed crude charge capacity of about 85,000 bpd. The use of the catalytic cracking unit at the former Esso property in Havana, which has not operated as such for more than a year, as a crude still gives Cuba an additional crude charge capacity of about 10,000 bpd. Because of normal operating limitations and down time for maintenance and repairs, it is unlikely that the crude distillation facilities, including the catalytic cracker as a crude still, could be operated on a sustained basis at more than about 85 percent of the designed capacity, that is, about 80,000 bpd. No increases in refining capacity are expected in the next two years.

Any increases in demand beyond the estimated sustained capacity of the refineries or, conversely, any decrease in the capacity which might result from refinery equipment failures would require Cuba to develop new refining capacity

or shift to a larger share of products in the composition of its petroleum imports. Although Cuba has maintained a high level of operation of existing refineries since mid-1960, it is believed that a progressive decline in capacity as a result of continued normal wear of critical equipment may be expected in the future.

Except as indicated below, the refineries are capable of producing all the types of products which Cuba now uses. As long as the catalytic cracking unit cannot operate as originally intended, Cuba cannot manufacture high-grade aviation gasoline. Moreover, Cuba probably cannot manufacture high-grade motor gasoline. Although Cuba's demand for these gasoline-type fuels is relatively small, Cuba, nonetheless is, dependent on imports for almost all of its supply of these fuels. Although Cuba probably could manufacture fuels suitable for use in jet aircraft engines, there is no evidence that it does and thus is now dependent on imports for these fuels.

Cuba does not have facilities for manufacturing lubricants (lube oils and greases) or components therefor, that is, bright stock or neutral oils. It does, however, have facilities in which it can blend components to yield lube oils. Thus Cuba is entirely dependent on outside sources for its supply of lubricants. Moreover, Cuba cannot produce lubricant additives (chemical compounds blended with the base materials to achieve certain quality characteristics). The Bloc, principally the USSR, can supply many different additives and/or finished lube oils containing additives. There are, also, non-US sources of additives.

c. Storage

The capacity of bulk oil storage facilities in Cuba was established by Western oil companies on the basis of short routes of supply from the Caribbean area. The limitations which these storage facilities impose on petroleum inventories because of the extended routes of supply from the Black Sea (about 20 days sailing) represent a potential vulnerability of the Cuban oil industry. Crude oil storage and demand represent an example of this limitation. At the current rate of supply of crude oil (72,000 bpd), the storage estimated to be allocated to crude oil would provide for 20 to 30 days of supply.

II. Capabilities

a. Supply of Petroleum

Domestic production of crude oil, which at present contributes only negligible quantities to the total supply in Cuba, is not expected to increase significantly in the foreseeable future. There appears, therefore, to be no early prospect for Cuba to reach self-sufficiency in the supply of petroleum.

The Soviet Bloc, principally the USSR, has the capability to supply Cuba's qualitative and quantitative needs for petroleum. Moreover, there are a variety of non-US and non-Bloc sources of petroleum which could also supply petroleum to Cuba contingent upon the ability of the latter to generate the necessary foreign exchange. The Bloc appears able to provide or charter sufficient tankers to move petroleum to Cuba from Bloc sources; and, in the continuing soft tanker market, there is sufficient non-US and non-Bloc tanker

capacity to meet Cuba's needs. In summary, availability of petroleum and tankers of non-US control appears to be adequate to meet Cuba's needs without affecting established world petroleum supply procedures.

b. Refining

Cuba does not have an indigenous capability to replace or expand its refining capacity. Moreover, Cuba must have outside help to maintain its existing plant in operational condition.

The Bloc has built complete refineries or installed selected process equipment in India, Syria, and Egypt and presumably could provide new or additional refining capacity in Cuba. Moreover, the Bloc, principally the USSR, probably can provide many of the replacement parts necessary to maintain the existing refineries at the current level of operation.

Similarly, there are a number of non-US and non-Bloc suppliers who also could provide replacement parts for the existing refineries. The degree to which equipment and parts built on metric-system specifications could be interchanged with similar items built for Cuba on English-system specifications would probably restrict the number of suppliers who could meet Cuba's demand for these items.

Cuba probably is having trouble procuring a wide variety of replacement parts for the refineries, although it is not possible to identify all of them. There are some parts which even the Bloc countries appear to have difficulty manufacturing as a result of

which the Bloc countries purchase such items in non-Bloc countries or use inferior or less efficient substitutes. The principal items include:

1. Automatic temperature and flow instruments (including complete units and parts therefor).

2. Gaskets, oil and chemical resistant seals, and packing materials.

3. High quality alloy steel tubes (4" and 6" inside diameter) for use at high pressures and temperatures in furnaces.

4. Small diameter carbon steel, copper, brass, and bronze tubing for condensers and heat exchangers.

III. Possible Courses of Action to Exploit Potential Vulnerabilities

Because the USSR appears to be able and willing to provide Cuba with its essential supplies of petroleum there is no obvious economic action which would exploit Cuba's heavy dependence on outside sources of supply.

The crude oil refineries in Cuba probably have suffered from poor maintenance procedures, the use of inferior, substitute replacement parts, the use of crude oil different from that for which the refineries were originally designed, and the intense use of the facilities since mid-1960. Although the crude oil throughput of

the refineries had not been reduced substantially through mid-1963, it may be expected that the annual throughput will be reduced progressively as time goes by. It is unreasonable, however, to forecast that the refineries would become completely inoperative in the foreseeable future. As refinery throughput declines and thus the demand for crude oil, the USSR could probably shift to an increase in the supply of products. This would be more costly for Cuba and might impose a heavier burden on the USSR supply and transport procedures. This burden could be reduced by procurement of products from such independent suppliers as are available, inter alia, in Egypt, Syria, Italy, the UK, and France. There is not sufficient evidence of Cuban interest or difficulties in procuring refinery equipment or parts in the Free World to speculate on any economic action which would exploit the vulnerability represented by the refining phase of Cuba's oil industry. If the supply of replacement parts for the refineries in Cuba were to become too difficult, the Bloc, principally the USSR, might build complete, new refineries in Cuba. This, of course, would be a costly effort and would require at least two years to complete.

There have been some minor additions to bulk facilities and some relocation of tankage since mid-1960. There are no indications, however, of any large-scale tank construction program of the type

that would be necessary to increase substantially Cuba's capability to maintain greater inventories of petroleum. There is no economic action that would be effective in exploiting this potential vulnerability of the Cuban oil industry.

ANNEX B

Electric Power Industry

I. Introduction

For the purposes of this study, the Cuban electric power industry is defined as encompassing the generating equipment and transmission lines that make up Cuba's two main power systems, essentially the same public utility formerly owned by a US corporation, American and Foreign Power Company, Incorporated. This industry accounts for almost 60 percent of national generating capacity and about 75 percent of national production of electricity. Of a total installed generating capacity of 560 megawatts (mw) in mid-1963, 505 mw were located in the Western Power System which extends from Havana eastward to Camaguey, and 55 mw were located in the Eastern Power System which stretches in a narrow band across the southern portion of Oriente Province. Virtually all of the transmission and boiler equipment, and approximately 45 percent of the turbine and generator capacity now installed in Cuba was manufactured in the US. The remainder of the turbines and generators were produced in Western Europe.

II. Present Operating Condition

Serious shortages of materials and spare parts pervade the entire Cuban electric power industry. Scarcity of even the most elementary materials has resulted in the use of makeshift components produced locally, and has caused some scavenging of parts from generating equipment already out of operation.

The gravity of the shortages was presented to JUCEPLAN, the Cuban Central Planning Council, in February 1963 by the director of the ECE (Consolidated Enterprise for Electricity) who singled out as particularly troublesome problems the difficulty in obtaining resins for water purification, the undesirably high iron content of caustic soda supplied by the USSR, and the inability of the Communist countries to furnish spare parts for US-manufactured diesel generators or transmission equipment. Further, he criticised the Cuban government for the unduly long periods taken to fill orders for materials, the diversion to other sectors of the economy of materials on order for the electric power industry, and the failure of industrial planners to standardize the procurement of diesel generating equipment, which has resulted in a wasteful investment in replacement parts and a shortage of diesel technicians to service the diverse makes. Despite the seemingly critical situation created by shortages of material, however, only about 50 mw, or roughly 10 percent, of the generating capacity installed in the two main power systems are believed to be out of operation. The reliability of the remainder clearly is diminishing and capacity is becoming increasingly susceptible to periods of temporary idleness.

Most of the capacity out of service in the Western Power System is located in the area of Havana. Only one outage for greater Havana was reported in 1962, but as of July, five had been reported in 1963. Evidently reserve capacity no longer is adequate to permit stopping generating units

for emergencies or maintenance without interrupting service to portions of the power network.

Powerplants in the Western System east of Havana appear, in general, to be satisfying demand, but there have been reports of trouble with machinery installed at Matanzas, Cienfuegos, and Camaguey.

In the Eastern Power System, trouble in the Santiago powerplant, the main steam powerplant serving the system, has caused the loss of 8 mw out of the 42 mw installed, and there have been malfunctions for lack of replacement parts in the diesel generating plants at Bayamo, Manzanillo, and Guantanamo. The transfer of 12 mw in diesel generating units from Havana to the Eastern Power System only partially compensated for the loss of the steam generating capacity. The director of the ECE stated that the Eastern Power System cannot extend service to new customers until the powerplant under construction at Rente begins to operate. Rationing of power occurs daily during peak load hours.

III. Purchases of Equipment

a. From the Bloc

Since nationalization of the Cuban electric power industry in August 1960, purchases of equipment from the Bloc (aside from that going into new powerplant construction) have been of little benefit to the main power industry. Virtually all of the equipment supplied has come from the USSR and Czechoslovakia. Available information indicates that these two

countries have supplied no significant amount of replacement parts to date and, barring a rearrangement of priorities, probably will not attempt to supply them.

Equipment received from the USSR consists largely of cable, switches, and small distribution transformers. Several hundred small diesel generators also have been shipped, apparently to be used at construction sites and isolated agricultural communities. A significant order for 20 medium capacity diesel generators with an aggregate capacity of perhaps 10-12 mw was placed in October 1962. It is not known if any of the units have been delivered; however, enough time has elapsed since placement of the order for delivery to have been completed. These diesel generators are large enough to be used effectively as peak-load capacity in the main power systems.

Equipment purchased from Czechoslovakia has been limited essentially to the same items shipped by the USSR, but on a smaller scale. Of the diesel generators furnished, it is estimated that only about 10 units with an aggregate capacity of perhaps 5 mw are of any consequence.

b. From Western Countries

With little or no prospect of obtaining replacement parts for existing generating equipment from the Bloc, it appears that Cuba has cultivated contacts with the UK, Canada, and France, and has become dependent on these countries for the materials needed. The UK has delivered a few medium capacity transformers, plus at least 4 diesel generators estimated to

have a capacity of 1 mw each. Canada has furnished about 1,000 small transformers reportedly worth $700,000. In addition, Canada shipped 20 diesel generators early in 1963 that, judging from the dimensions of their crates, have a capacity of roughly 1 mw each. These units were transported to the UK for testing and reshipment, possibly as a ruse to circumvent the US embargo. France reportedly supplied parts worth about $400,000 for a powerplant in Havana and currently is installing a 37.5 mw turbogenerator at the Marti powerplant in Matanzas. This unit probably will be ready for operation by the end of 1963.

Potentially the most significant source of aid from Western countries is a contract for replacement parts worth 4-5 million dollars being negotiated at present by the agent of a French firm. Inasmuch French-built equipment in Cuba is relatively new, and thus probably does not require spare parts of this magnitude, and comprises only a small part of Cuban generating capacity, the monetary value of this contract indicates that the replacement parts will be for the electric power industry in general, not solely for equipment of French manufacture. The value also may be compared to the planned 6.1 million dollars allocated for replacement in the JUCEPLAN scheme for future expansion of the electric power industry.

IV. Operation of Electric Power Industry to 1965

In late 1964 or early 1965, initial operation of the powerplants being built at Nuevitas and Mariel with aid from the USSR will alleviate the need to

maintain older equipment. The trend of more frequent outages will continue unless some means are found to overcome presently constricted channels of supply. In view of the nearly 40 mw of capacity in significant diesel generating units received during 1962-63, the purchase of large diesel generators probably is no longer necessary. In any case, the smaller generating capacity, greater maintenance problems, and shorter life prevent diesel generators from effectively replacing steam powered equipment, except as a short term solution to present shortages of power. Therefore, the key to providing adequate electricity for the Cuban economy during the next 18 months appears to lie in the acquisition of sufficient replacement parts to maintain existing steam powered equipment.

On the other hand, it is doubtful that complete denial of spare parts from the West would bring the electric power industry to its knees, or that power supplies to Cuba's main industry would be restricted immediately. Experience has proved that powerplant equipment generally can be operated for extended periods, even if sporadically, by use of substitute materials and makeshift techniques. Although Cuba's priorities are not known, it can be reasonably assumed that as power supplies dwindle, the government would curtail or cut off power first to residential-commercial users, then to light industry, and finally to heavy industry. Hence, the most immediate result would be discomfort and inconvenience to the population; industry probably would have adequate supplies of power until the shortages surpassed

the amount of power consumed by residential-commercial users, historically about 50 percent as indicated by the following consumption pattern:

Total Consumption of Electric Power in Cuba, 1958

Consuming Sector	Percent of End Use
Industrial	
Sugar industry	18
Other industry	24
Commercial	24
Residential	20
Governmental and other	8
Total end use	100

Industry will account for a higher proportion of total consumption in the future but it is believed that as yet there has been no radical departure from the 1958 pattern. Sugarmills draw some power from the main networks to supplement local generation, but they are essentially self-sustaining. Industrial installations isolated from the main power network such as those at Santa Lucia, Nicaro, and Moa Bay, also have their own sources of power generation.

Although the amount of generating capacity likely to be out of operation if no spare parts were available to Cuba from external sources is unknown, it might amount to 25-35 percent at any point in time. Occasionally, defects in a large component might cause a generating unit to be out of service for extended periods, but generally the idleness would be of relatively short duration.

The material needs of the Cuban electric power industry are so broad that it is impractical to recommend the denial of specific items. It is estimated that a significant curtailment of the 4-5 million dollar replacement parts contract being arranged by the French firm mentioned above or delays in the execution of the contract would have a serious effect on the reliability of the Cuban electric power industry. Fulfillment of this contract may mean the difference between adequate electric power and chronic shortages.

Appendix C

Chemical and Rubber Industry

1. Present Situation

The chemical and rubber industry occupies a modestly significant role in the Cuban economy. At present, the industry is relatively larger than in the pre-Castro period but its contribution to total manufacturing is about the same as before, mainly because material shortages and other conditions are preventing the Cubans from operating the production facilities at full capacity. The most important products of the industry are alcohol and rayon, both of which are exported; sulfuric acid, chemical fertilizers, and rubber tires.

The most distinctive feature of the chemical and rubber industry is its heavy dependence upon raw material imports, which in pre-Castro times came largely from the United States. Reorientation of the sources of supply has been accomplished with some difficulty, and output has been adversely affected by poor scheduling and by the lower quality of many of the materials which Cuba must import. Largely through assistance from the Bloc, notably the USSR, and from trade with certain Free World countries, Cuba's chemical and rubber industries have been able to obtain enough of the required raw materials to operate at least at partial capacity. Where necessary, imports of finished chemical and rubber products have supplemented Cuban production.

Other limiting characteristics of the chemical and rubber industry

are the shortages of skilled manpower (scientists, technicians, and managers), and the lack of a developed machine-building industry for producing the chemical and related equipment required to maintain and expand chemical production facilities. To date, the Soviets have provided little assistance to the Cubans in the form of new plants, equipment or effective technical advice for chemical and rubber production. Some assistance has been obtained from Free World countries in constructing chemical plants, but uncertainty over Cuba's ability to make payment to the Italian firm De Nora has delayed completion of the ammonia synthesis section of the Island's only nitrogen fertilizer plant located at Matanzas. Moreover, the Patrice Lumumba sulfuric acid plant recently completed at Santa Lucia by the French firm Krebs et Cie. has encountered difficulties under its Cuban operators. Presumably, however, the Soviets could come to the aid of the Cubans and supply the technical advice and equipment needed to complete and operate these and other facilities essential to the Cuban chemical and rubber industry.

In short, therefore, there do not appear to be any crucial raw materials or equipment which the Cubans could not obtain, either directly or indirectly, from the Soviets to operate their chemical and rubber industries. Moreover, such diversion from the USSR and/or the European Satellite countries, in all probability, would not be sufficiently great to impose a serious drawback in production or cause a reallocation of resources in the Bloc countries.

The commodities and areas of the chemical and rubber industry in which

Cuba is experiencing difficulty are listed below.

II. Selected Commodity Facets

A. Carbon Black

1. Supply Situation

Cuba has experienced a chronic shortage of rubber vehicle tires with requirements exceeding production by an estimated 30 percent. (The Bloc has supplied tires to Cuba and could supply the entire 30 percent or, if necessary, all of Cuba's tire requirements, although to do so would place some additional strains on the Bloc's already tight supply situation.) An important factor in Cuba's inability to produce at near capacity and meet demands has been the shortage of raw materials, including carbon black which is a reinforcing filler in the manufacture of tires. Cuba has no facilities for such production. It is estimated that to meet all its tire needs, the Cuban tire industry would require about 5,000 tons of carbon black per year. Though conceivably all of this carbon black could consist of lower grade (channel) carbon black, which the Bloc produces in adequate amounts, ideally a certain percentage should consist of high abrasive type carbon blacks which enhance tire wear possibly by a factor of 25 percent. The high abrasive furnace blacks are in short supply in the Bloc, and to date Cuba has imported most of these from the West.

2. Potential Vulnerability

Denial to Cuba of Western supplies of high abrasive carbon black (ISAF and HAF) probably would impose an additional, although

temporary, hardship on the Cuban economy. Establishing new sources of supply in the Bloc would take time and might result in a further cutback in Cuban tire production. Moreover, the Bloc itself is short of these high abrasive blacks and in the short run might choose to export lower grades of black to Cuba, which would have the effect of reducing the service life of Cuban tires and thereby aggravating the existing tire shortage. For the longer run, however, denial of these high abrasive blacks probably would not have a significant effect on Cuban tire production because the USSR, presumably without difficulty, could increase its imports of these blacks from the West, which in 1961 amounted to 33,000 tons, sufficiently to allow for diversion of the required amounts to Cuba.

3. Countries Supplying Carbon Black to Cuba

(a) Channel black (common grade carbon black) is imported primarily from the USSR and Rumania.

(b) High abrasive carbon blacks have been obtained principally from Wolf Trading Corporation, Antwerp, Belgium, and from Karl O. Helm, West Germany. The former firm claims to be no longer trading with Cuba. The latter firm has obtained carbon black from Lummerzheim, M. H. & Co. in Ghent and has shipped it to Cuba via Yugoslavia.

b. Other Rubber Intermediates

1. Supply and Potential Vulnerability

In addition to carbon black, there are special additives and

processing materials for rubber tires which Cuba does not produce and currently imports almost exclusively from Western sources. While complete denial of these materials seems unlikely in view of probable transshipment via the Bloc, even a temporary interruption in present sources of supply would cause some cutbacks in tire output and therefore might be considered as an efficacious form of economic harassment. As in the case of carbon black, Cuba could circumvent a shortage of these materials by obtaining finished tires from the Bloc, although additional strains would be placed on the Bloc's already tight supply situation.

2. Commodities and Suppliers

(a) Ty-Ply "C" (a rubber-to-metal, vulcanizing adhesive) has been supplied by Karl O. Helm, West Germany. It is produced exclusively by Harbon Chemical Division of Borg-Warner Corporation, Washington, West Virginia and distributed in Europe exclusively by British Anchor Chemical Corporation, 366 Madison Ave., New York 17, N.Y.

(b) Vulcafor BBS (an anticoxidant) has been supplied by Imperial Chemical Industries, Ltd., England. Cuban currency shortages have on occasion interfered with shipments from this firm.

(c) DPAA (an anticoxidant) has been supplied by Manufacture Lorraine des Produits Chimiques (MLPC), 1 rue des Italiens, Paris 9, France.

(d) Thiuram MS, TMTM (an accelerator) has been supplied by L. Naudel and Co., Belgium.

(e) Vulkalent A (nitrosodiphenylamine, an antioxidant) has been supplied by Fabrications, Etudes, Conseils pour L'Industrie Chemique, France.

c. Caustic Soda and Chlorine

1. Supply Situation

Cuba has one facility which produces caustic soda and chlorine; this plant's capacity would satisfy Cuban requirements for chlorine but only 7 percent of its caustic soda needs. The Cuban producer, Electro Quimica del Caribe at Sagua la Grande in Las Villas Province, is believed to be experiencing production difficulties (see Machinery and Equipment, below), resulting in output at only a fraction of capacity. Cuba reportedly was attempting to import chlorine in 1962 and is believed to have maintained a high level of caustic soda imports, most of which have come from the USSR and in lesser amounts from the UK, Poland, Czechoslovakia, and China in the first half of 1963. Cuba's estimated national requirements and use-pattern of chlorine and caustic soda are:

Chlorine (1,500 tons/yr required)

Use: Hydrochloric acid - 50%
Pulp and Paper Manufacture - 28%
Water purification - 14%

Caustic Soda (30,000 tons/yr required)

Use: Rayon Manufacture - 33%
Soap and Detergent - 19%
Pulp and Paper Manufacture - 29%
Other - 19%

2. Potential Vulnerabilities

The loss of electric power at Electro Quimica would lead to suspension of production of chlorine and caustic soda. Loss of power could result from the breakdown of the plant's on-site hydroelectric generating facilities. However, in this event, the plant might obtain emergency power from external sources via transmission lines. In addition an emergency diesel driven power generator is available at the plant.

The loss of caustic soda production at Electro Quimica would cause the Cubans little or no difficulty because they are presently importing probably more than 90% of the supply. The loss of chlorine production would be somewhat more serious for the Cubans since the Island's entire supply comes from this plant. Shut-off of the chlorine supply would be felt mainly in the public health sector because of the lack of chlorine for sterlizing water supplies. The effect, however, probably would be of a short duration because the Soviets could provide Cuba's minimal requirements without difficulty.

d. Nitrogen Fertilizer

1. Supply Situation

Cuba is believed to be receiving generally adequate supplies of nitrogen fertilizers, largely through imports from the USSR. Although the quantity supplied by the USSR is not very large (about 240,000 tons or about 4% of Soviet production in 1962), it nevertheless must pose some sacrifice to the USSR which is currently having problems meeting its own domestic needs for increased supplies of chemical fertilizer.

Cuba has one chemical nitrogen fertilizer plant, the Cepero Bonilla plant at Matanzas, which, if it were operating at capacity, probably could supply two-thirds of Cuba's needs. The total loss of this capacity for a period of one year would cost the Cubans an estimated US $7 million in fertilizer imports.

2. Potential Vulnerabilities

In the event that a shortage of spare parts were to result in the shutdown of the steam generating facility, production at the Cepero Bonilla plant would be interrupted and possibly suspended for an extended period. Steam is essential both in the production of nitric acid and ammonium nitrate, and for producing power (10 megawatts). Curtailment or suspension of production at this plant could also result from similar shutdown of the reactors and absorption columns in the nitric acid plant and/or the reactors, evaporators, and crystallizers in the ammonium nitrate plant.

e. Insecticides

1. Supply Situation

Cuba's agriculture reportedly is suffering from an inadequate supply, as well as improper application, of chemical insecticides. In 1962, the rice crop in particular allegedly sustained damage due to the shortage of insecticides. Among the most important insecticides used in Cuba are: DDT, chlordane, benzene hexachloride, pyrethrum, Captan-50, and such organophosphorus compounds as parathion, malathion, and systox.

Cuba lacks facilities for producing insecticides, and in the pre-Castro era relied upon the US for virtually all its needs. Subsequently, Cuba has obtained chlorinated-type insecticides (for example, DDT and benzene hexachloride) from the USSR, but reportedly has been obliged to obtain organophosphorus insecticides from West European sources. In exchange for the Bay-of-Pigs' captives, Cuba demanded and received from the US large quantities of insecticides, some of which were in ready-to-use form but others, such as parathion, malathion, and dicapthion, required formulation with emulsifiers before being applied to agriculture. In an effort to get such emulsifiers, Cuba has approached the Dutch firm of

C. Lichtenvoet & Zoon, H. V. Vierhavenstraat 56, Rotterdam, which has expressed reluctance to supply Cuba with formulating materials and technology on the grounds that this would promote a local formulating industry in Cuba.

2. Potential Vulnerability

The selective denial of insecticides and related formulating materials would impose additional hardships on an already hard-pressed Cuban agriculture. Most significant would be the denial from Western sources of all organophosphorus insecticides. Since shortages of these currently prevail in the Bloc, it is felt that Bloc shipments to Cuba would be made with reluctance and probably with some difficulty on the part of the supplying Bloc country.

3. Suppliers

To date, Cuba has received most of its organophosphorus insecticides from The Netherlands. In addition to the firm of C. Lichtenvoet & Zoon mentioned above, which was requested to supply formulating materials, the following are reported to have been contacted and/or to have shipped insecticides to Cuba:

(a) Verhagt Co., at Tiel

(b) N. V. Dimonie, Rotterdam. (This company has shipped Captan-50)

F. Machinery and Equipment

1. Supply Situation

Cuba lacks a developed machine-building industry and has

traditionally relied on the West, the US in particular, for repair and replacement parts for its chemical industry. Evidence to date indicates that the Bloc has not provided the Cubans with the needed machinery and parts to keep its chemical plants operating at a high level. Italy and France have been involved in constructing and equipping some chemical facilities but, as indicated in the following sections, problems have arisen either due to Cuba's reluctance to make payment or its inability to operate efficiently the completed plants. Furthermore, the problem of obtaining repair and replacement parts for chemical equipment is expected to become more serious as time goes on due to the poor maintenance, the aging of such equipment, and the general level of technical competence of Cuban personnel.

2. Potential Vulnerabilities

Delivery of Western equipment for repair of expansion of Cuban chemical plants is important for chemicals production and plans for expanded output. The Bloc is not believed to be in a strong position to provide substantial assistance to Cuba's chemical industry in the form of plant and equipment, especially at the present time when the Bloc is making a substantial effort to acquire chemical plant in the West for itself. The following illustrate specific areas of the Cuban chemical industry where problems in supply of chemical equipment exist:

(a) Synthetic ammonia equipment. The Ormonio de Nora Co., Milan, Italy, has been constructing and equipping a synthetic

ammonia facility at the Cepero Bonilla fertilizer plant in Matanzas. Delays in completing the plant and in equipping it reportedly are due in part to uncertainty of receiving payment from Cuba. Furthermore, a shortage of automatic control equipment has delayed initial operation of the ammonia plant. If construction of this plant were suspended, Cuban plans for domestic production of nitrogen fertilizers would be seriously disrupted. In addition, a breakdown of the ammonia synthesis equipment already installed (particularly the gas compressors and the synthesis columns) would further disrupt such plans.

(b) Carbon electrodes. The Electro Quimica del Caribe plant at Sagua La Grande has been forced to import carbon electrodes -- used in producing chlorine -- from China and Czechoslovakia. In both cases, problems have occurred with these electrodes imported from the Bloc, and it is probable that Cuba will try to obtain carbon electrodes and asbestos paper for the chlorine cells from some Western firm. Denial of such would have an important bearing on Cuba's ability to maintain adequate production of chlorine, caustic soda, and aluminum sulfate.

(c) Technical assistance and repairs for the Patrice Lumumba Sulfometales Plant at Santa Lucia. This plant is Cuba's second largest producer of sulfuric acid. The plant was constructed and placed in operation in 1961 with assistance from the French firm of Krebs et Cie, 38 Rue Parmentier, Neuilly sur Seine.

The plant is believed to have recurrent production problems and in August 1963 reportedly sustained damage to its sulfuric acid tanks and acid lines from gunfire. The above French firm may be called upon to assist the Cubans in overcoming production difficulties and possibly in repairing damaged equipment.

Appendix D

Minerals and Metals Industry

I. Introduction

An analysis of the mineral and metal industry of Cuba indicates that only nickel is significant in terms of output or foreign exchange earnings. Although output of copper concentrate and manganese ore in Cuba may have some economic potential, they currently are insignificant compared to nickel. The discussion of Cuba's potential economic vulnerability insofar as minerals and metals are concerned, therefore, is limited to nickel.

II. Significance of Cuban Nickel Output

In 1961, exports of nickel amounted to 83 percent of the total value of Cuban exports of minerals and metals; in 1962, nickel probably accounted for at least as large a percentage. Exports of nickel in 1961 amounted to only 5 percent, however, of the total value (US $625 million) of Cuban exports. Nevertheless, Cuban nickel made an important contribution to the nickel supplies of Bloc countries. Approximately one-half of Cuba's nickel exports was shipped to the USSR, and the remainder was shipped to Czechoslovakia, Poland, Hungary, Communist China, and Rumania. If Soviet plans for the Cuban nickel industry are fulfilled, the value of nickel production in Cuba after 1965 will be 3 to 4 times present output.

Cuba's current production of nickel, estimated at about 20,000 tons of nickel equivalent in 1962, amounts to approximately one-half the combined rated capacities of the former US-owned facility at Nicaro and the former Freeport Sulphur Company plant at Nica Bay. This level of output is somewhat higher than that in the period immediately preceding Castro's takeover; it

was achieved through expanded production at Moa Bay -- an installation which had barely begun operations at the time of its expropriation. Nicaro produces a nickel-oxide sinter and Moa Bay a semi-refined nickel-cobalt slurry, which was formerly refined into a useful product in the US. Now dried slurry from Moa Bay is shipped to the USSR for further processing.

III. Potential Vulnerability

a. Nicaro Operations

1. Replacement Parts and Equipment

Difficulty in procuring US-manufactured replacement parts and equipment continues to handicap operations at the Nicaro plant. Procurement of such equipment, particularly neoprene diaphrams for pumps, canvas filters, special lubricating oils, tractor parts and refractories, by other Bloc countries, particularly the USSR, from Free World countries has tended, however, to alleviate the pinch on Nicaro operations. Procurement by third countries for delivery to Cuba could continue to supply the equipment in the quantities necessary to keep Nicaro operating.

2. Raw Materials

The Nicaro process requires large amounts of ammonia and anthracite coal. Ammonia is being supplied by the USSR. The price of a ton of ammonia from the US before nationalization was $85; Soviet ammonia costs Cuba US $124 per ton. In 1962, Nicaro imported more than 30,000 tons of Soviet anthracite coal for manufacturing producer gas and for sintering. Soviet coal was found to have too much sulphur for sintering, and coal from North Vietnam has now been substituted.

b. Moa Bay Operations

1. Replacement Parts and Equipment

As in the case of Nicaro, Moa Bay needs miscellaneous replacements for US equipment. A critical need for the successful operation of the Moa Bay plant is a continuing supply of titanium and teflon parts. The Moa process involves the use of extremely corrosive sulphur compounds at high temperatures. To reduce corrosion, titanium and teflon are used for fabricating many of the components in the plant. For replacement parts, both of these materials were bought from the USSR in 1962. The titanium, however, may have originated in Japan and the teflon in France.

2. Raw Materials

Sulphur is a basic raw material in the Moa Bay nickel process. Dark sulphur can be used in the sulphuric acid plant, but super-pure yellow sulphur must be used for the production of hydrogen sulphide. The USSR is supplying the dark sulphur. The yellow sulphur has been obtained from Mexico and France, but other countries also may supply this material.

Appendix E
Transport

I. Current Situation

a. General

Although the transportation system of Cuba is well developed by Latin American standards, it is still less than adequate for the needs of the economy. This was true even before the deterioration of the system under the Castro regime. The road and rail system is for the most part located in a central corridor stretching nearly the length of the island with connecting links to the major ports. For many years coastal shipping was the principal means of intra-island transport but the development of railroads and highways caused a decline in coastal trade except for bulk items such as lumber, cement, and sand. Road and rail construction and maintenance have been facilitated by the flat or undulating terrain and the small number of streams. The rail system was built to serve the sugar industry almost exclusively. Highway construction has not progressed uniformly, with some areas, especially in the east, having been particularly neglected.

The widespread absence of farm-to-market roads is a serious problem that has retarded rural development and agricultural diversification especially in Camaguey and Oriente provinces. Not until the last years of the Batista regime did a much needed highway construction and repair program get underway, and although the number of feeder roads allegedly doubled during this period most of the highways were in poor repair when Castro took over. Since then, maintenance and repair

of the rail and highway networks have been sporadic and apparently new construction has been largely limited to that required for military purposes.

b. Railroads

The dominant position held by the 8,360-mile railroad network in the transport system of Cuba stems from the close relationship between the sugar industry and the railroads. The rail network was designed specifically to accommodate the sugar traffic. In many cases the railroads provide the only feasible means of moving the crops to the processing centers and the ports. This network, nationalized in June 1960, and since operated as the National Railroads of Cuba, consists of 2,470 miles of common-carrier lines and 6,090 miles of industrial lines. The common-carrier lines are almost entirely standard-gauge (4' 8½") but the industrial lines, which consist mainly of some 200 short sections of track connecting the sugarcane fields with the processing plants, are made up of both standard and narrow gauge lines.

Information regarding the performance and inventory of the Cuban railroads pertains almost solely to the common-carrier system. About 80 percent of the freight tonnage and 65 percent of the freight revenues of the railroads were formerly derived from the movement of sugarcane and its products. Recent statistics are not available, but in 1956, the railroads carried nearly 22 million metric tons of freight and about 7.7 million passengers. It is believed that the railroads had excess capacity in prerevolutionary days and that the damage sustained by the railroads during the political revolution was repaired by early 1959.

Since 1959, however, railroad track facilities, equipment, and maintenance practices have deteriorated to the extent that the combined measures of operating efficiency have decreased by an estimated 20 percent. A decrease of this magnitude may be a very conservative estimate, however, judging from reports that a serious lack of motive power is the most significant shortage in the rail system. It has been reported, for example, that about 35 percent of the diesel locomotives in Cuba are inoperable due to a lack of spare parts and maintenance. About one-half of the common-carrier system is dieselized; the remainder of the common-carrier and all the industrial lines use steam locomotives. Since the railroad system was essentially US-built and equipped and since the US is denying Cuba spare parts for machinery, the problem of repairing diesel locomotives in particular has become acute. Another factor contributing to a loss of efficiency is said to be poor administration and supervision of operations resulting from nationalization. Experienced administrative and technical personnel have been replaced by less competent personnel, with the result that maintenance of equipment and track facilities has been disrupted.

These shortcomings in rail transport, however, will not seriously handicap the economy in 1963. Apparently the rail system was easily able to handle traffic resulting from the production of nearly 6 million tons of sugar in 1959. Although there may have been some transportation problems in 1961 with a larger sugar crop, the decrease in sugar production to about 3.8 million tons in 1963 reduced the demand for railroad service. There is no evidence that loss of rail transport capacity has materially affected the movement of this year's sugar crop to Cuba's

seaports.

c. Highways

Cuba's 8,300-mile highway system basically supplements rail transport, accounting for about 75 percent of all the freight not carried by rail and providing the major form of passenger transport. About 60 percent of the road network has an improved surface, the remainder being of unimproved earth. The Central Highway extends the length of the country, a distance of 712 miles, and feeder roads provide access to other areas. The network is most dense in the Havana area and most sparse in the extreme eastern part of the country. Although the main roads are in fair to good condition the overall condition of the network is poor to fair. Maintenance is hampered by lack of equipment and local material shortages, reportedly due to the allocation of such materials to higher priority or military construction.

In 1959 Cuba had about 42,000 trucks, 4,300 buses, and 170,000 private automobiles. By 1961 the number of vehicle registrations had dropped to 37,500 trucks, 3,000 buses, and 91,000 private automobiles. During 1959, vehicle imports from the US totaled about 6,000 compared with 7,200 from other countries. Since January 1961 Cuba has had increasing difficulty in importing replacements and spare parts, particularly for US-manufactured vehicles. Consequently, Cuba has turned to Bloc countries for vehicles but such vehicles do not compare favorably with US vehicles in performance and reliability. Cuba imported about 15,000 trucks and 450 buses from the USSR in 1960-62, and so far has received a few hundred vehicles from other Bloc countries. The bulk of the buses in service are still American GM's and

British Leylands. Mainly due to the problem of obtaining spare parts for buses, and to a lesser extent for trucks, the motor transport situation in Cuba has deteriorated rapidly over the past three years. Lack of brake linings, bearings, axles, and other parts has caused numerous buses and trucks to be abandoned, cannibalized, or kept out of operation. Poor quality or lack of lubricants has contributed to breakdowns as well. Some reports place the percentage of vehicles out of operation in Havana alone as high as 50 percent.

Since both passenger and freight transport have been nationalized it is the responsibility of the Ministry of Transport to attempt to improve the situation. Trucks and formerly privately-owned automobiles are being used for public passenger transport. Public service on both rural routes and city routes has been cut back. Efforts have been made to manufacture spare parts on a limited scale. Without any large factories for this purpose, however, the Cubans undoubtedly have been forced to use small machine shops in which they probably have produced such parts as brake linings and have reconditioned such parts as clutch discs. Wherever feasible, parts imported from Communist countries have been adapted for use in vehicles of US and British manufacture. Some improvement in the motor transport situation is possible before the end of 1963 because of the new buses and spare parts which have been imported from Bloc countries, and as a result of the efforts being made to improve maintenance services, train mechanics, and discipline busdrivers.

II. Potential Vulnerabilities and Shortages

a. Locomotive Inventory

Denial of precision made spare parts for diesel locomotives could seriously affect the operation of the locomotive inventory.* Other spare parts for locomotives can be made in any machine shop if basic babbitt or bronze bearing metal is available. Denial of spare parts needed for locomotives, however, did not disrupt the rail transport service required in 1963 for the current level of sugar production since diesel locomotives can be cannibalized to a certain extent and, if necessary, steam locomotives from the industrial lines also can be substituted for the diesels which normally operate on the main lines. In addition, the Bloc could, if necessary, supply locomotives to Cuba as it has done in its aid program to other underdeveloped countries.

b. Motor Vehicle Inventory

Although motor freight transport in Cuba is important for local distribution, the lack of vehicles, while disruptive, is not a serious problem to the economy. The lack of bus transportation in such large cities as Havana, however, has been causing widespread discontent and economic losses resulting from a reduction in labor productivity and the disruption of work schedules in industry and commerce. This situation may only be temporary, however, for more vehicles and necessary spare parts for these vehicles could be imported from other Bloc countries and some specific spare parts of western manufacture patterned after US parts could probably be

* The following precision made spare parts were needed for the overhaul and conditioning of diesel locomotives in mid-1962: injection systems; injection nozzles; pistons, casings, and rings; diesel engine gears; oil pressure pumps; relay devices; electric motors 250 HP; coils; turbine rotors and bearings; diesel engine crankshafts; ball bearing units; exhaust and intake valves; reversing mechanisms; German ball bearing cases, gears, pressure pumps, rapid exhaust valve diaphragms, and pump rotors; German turbine rotors and ball casings.

purchased abroad by devious means. Moreover, in May 1963, a factory for the manufacture of spare parts for motor vehicles was being installed in Havana which, when completed, will be able to produce at least some of the critically needed parts. Therefore, a denial program in this field should be applied across the board to all kinds of spare parts.

NO FOREIGN DISSEM

Appendix F

Telecommunications Industry

I. Introduction

When the Castro regime came to power in 1959, it inherited a telecommunications system that varied considerably in ownership, sophistication, and operational status. Networks owned and directed by foreign groups existed side-by-side with domestically controlled and operated networks. Modern, multi-channel microwave radio relay networks were paralleled by antiquated, single-wire and point-to-point radio telegraph networks utilizing manual Morse transmissions. Most of the more modern and well maintained networks were left largely intact during the revolution. The older and more poorly maintained networks suffered the most extensive damage. At the outset, the new government realized that the integration, standardization, and modernization of the telecommunications base was essential if service requirements were to be met on a continuing basis.

Two courses of action were adopted to improve the telecommunications system. The first was to gain control of the privately owned networks, both foreign and domestic, and the second was to expand and improve the telecommunications base by the introduction of new, modern facilities. The first course of action has been completed but the resultant loss of highly qualified technicians and managers negated some of the gains hoped for by the unification of the various networks under centralized control. This loss of critical manpower and the reliance on the Soviet Bloc for equipment has retarded the second course of action-expansion and modernization of the system.

SECRET NO FOREIGN DISSEM

As a result of intervention and nationalization, the Ministry of Communications has become the largest communications entity in Cuba, controlling the major telephone, telegraph, point-to-point radio, and microwave radio relay networks. In 1962 the Council of Ministers created the Cuban Radio Broadcasting Institute (Institute Cubano de Radiodifusion--ICR) which assumed control of all radio and television broadcasting from the Ministry of Communications.

II. Current Status of Facilities

a. Microwave Radio Relay

There are two major microwave radio relay networks in Cuba. The most important of these is the Red Oficial de Comunicaciones por Microondas (ROCMI) network, primarily used for military traffic. The other network, known as the Microondas Nacionales, is used mainly for the relay of television programs, but also carries some telephone traffic. The ROCMI network forms a main communications artery running from Santiago de Cuba through Havana to Pinar del Rio. A sizable number of very high frequency (VHF) and ultra high frequency (UHF) spur lines from this artery connect military establishments throughout the country with Havana. The ROCMI network has a potential capacity of 120 telephone channels but by mid-1963 the original 24-telephone channel equipment was still in use. The Microondas Nacionales network provides two television channels between Havana and Santiago de Cuba and 8 telephone channels between Havana and Camaguey.

Plans for the improvement and expansion of the MOCRI network have been realized in part as all planned VHF and UHF feeder lines have been successfully expanded. To implement plans for the expansion of the capacity of the main network to 120 telephone channels by 1965, Cuba has turned to Hungary and is negotiating with the Beloiannisz Plant in Budapest for the manufacture and installation of the needed 120 channel equipment. By the end of 1962, Cuba had forwarded to this plant the technical documentation on the equipment needed to expand the network.

b. Telephone

Prior to being nationalized in August 1960 the telephone system of Cuba consisted of some 170,000 telephones, the majority of which were concentrated in the 12 largest cities. About 90 percent of the telephones were connected to automatic exchanges. Most long-distance calls were carried over open wirelines, but service was fairly good and plant equipment was kept in good working order.

Upon nationalization of the telephone system, plans were immediately set in motion to enlarge and expand the system. Agreements were reached with Hungary to import, by the end of 1965, 125,000 telephones and 60,000 lines of rotary telephone switchboard equipment. These plans apparently have remained unchanged but serious delays have been encountered in the delivery and operational use of the equipment received to date. Because the rotary telephone switchboard equipment

is not compatible with existing exchanges, it has been necessary to provide separate central office facilities for rotary exchanges and to design and construct equipment for interconnecting rotary and step-by-step facilities.

Plans also were formulated to increase the capacity of the long-distance telephone open wireline and underground cable network through the installation of Hungarian carrier equipment. Although these plans were to be executed by the end of 1962, delays in the supply of equipment probably will retard completion of the program until mid-1965. These delays, as well as qualitative shortcomings in other telephone equipment received from Hungary, have resulted in a growing disenchantment with Hungarian technical and material aid.

c. Telegraph

The domestic telegraph network operated by the government in 1959 consisted of about 400 telegraph stations interconnected by some 10,000 miles of open wirelines and supplemented by about 22 point-to-point radiotelegraph stations. In addition, there were 54 privately-owned point-to-point radio stations that passed domestic telegraph traffic. Maintenance of the telegraph system was extremely poor and interruptions in service were common. In 1959 and 1960, all privately-owned systems were taken over by the government.

Soon after the Castro takeover, plans were initiated to improve and modernize the telegraph system. These plans entailed the conversion of at least 100 of the 400 manual Morse telegraph offices to teletype operations, the establishment of nationwide subscriber teletype (Telex)

network, and the renovation and expansion of the telegraph wireline network. Execution of these plans, however, has progressed at a slow rate. To date only telegraph offices serving the armed forces have received teletype equipment and the delivery from Hungary of BTO 4 (4-telegraph channel) carrier equipment for telegraph wirelines has fallen far behind schedule.

d. Broadcasting

Since coming to power, the Castro Regime has depended heavily upon broadcasting, both radio and television, for domestic and international propaganda purposes. In the field of domestic radio-broadcasting, a vast reorganization of the system was started in the summer of 1961. As part of this reorganization, twelve 5-kilowatt (kw) and three 50-kw transmitters were purchased from Hungary early in 1962 and other equipment has been ordered from Czechoslovakia. Eventually, facilities of the system probably will be organized into 3 or 4 nationwide networks of about 12 stations each, a single minor network of 3 or 4 stations that wil serve 5 of the 6 provinces, and 12 or more local stations.

With the completion of the multimillion-dollar international radio-broadcasting station at Bauta in 1962, which is equipped mainly with transmitters imported from Western European countries, Cuba now ranks first among all the countries of the Caribbean and Central and South America in international radiobroadcasting. Although there is every indication that Cuba intends to maintain and even enlarge this lead by adding to its transmission schedule, there is no indication of major plans to expand its transmitting facilities.

In the field of television, there are now two nationwide television networks. The two existing networks, CMQ-TV and CMBF Television Revolucion, have been extended into Pinar del Rio so that all of Cuba is now within the range of this most effective propaganda medium. The equipment for this expansion and the spare parts needed to keep the networks in operation apparently have come from the now defunct CMAB-TV network and four Havana and Camaguey stations. There are no known plans for the expansion of the television system. Replacement parts for existing equipment, originally built by Western companies, are currently in short supply.

III. Assessment of the Potential Vulnerabilities of the Telecommunications System

a. Economic

Cuba always has been dependent upon imports to meet its requirements for telecommunications equipment. Before 1959, nearly all of these requirements were met through imports from the US. Imports from Free World countries such as Switzerland, West Germany, and Canada were quite important through 1961 in order to maintain and operate the existing telecommunications system. The volume and importance of such imports from Free World countries has fallen considerably since 1962 when Cuba began to tie almost all of its urgent telecommunications equipment requirements to Bloc countries, primarily Hungary, Czechoslovakia, East Germany, and the USSR. For this reason, a program of economic denial would have little long-term debilitating effect on the operation of the telecommunications system. At best such a program would result in short-term delays in acquiring small quantities of specialized equipment.

If shortages of Free World equipment became critical it is reasonable to assume that Cuba could turn to the Bloc to meet its needs. Although the electronics industry of the Bloc experiences some difficulties in meeting its own internal needs, the demands of Cuba would not add significantly to current Bloc requirements for electronic equipment.

Appendix G

Agriculture

I. Introduction

Sugar cane production dominates the agricultural sector of the Cuban economy. More than half of the total crop land is devoted to the production of cane, with most of the remainder used for corn, rice, beans, tobacco, sweet potatoes, malanga, coffee, cocoa, citrus fruits, and miscellaneous vegetables.

The main agricultural exports are sugar and sugar-derived products (accounting for about 80 percent of the value of total Cuban exports), tobacco, and miscellaneous fruits and vegetables. The main agricultural imports are wheat and flour, rice, beans, cotton, vegetable oils, and animal fats.

Sugar cane is an exceedingly bulky product, containing only about 12.5 percent sugar and the rest mostly water and cellulose. Accordingly, closely entwined with sugar cane production is a sugar extraction industry which produces the raw sugar for exporting and refining. At the present time Cuba has 152 operational sugar grinding mills distributed throughout the island.

Cuban sugar production immediately prior to the Castro take over approached an average of 6 million metric tons (mt) per year. After Castro nationalized the sugar mills in 1960, Cuban sugar production rose to 6.8 million mt in 1961 and then declined to 4.8 million mt in 1962,

and further declined to 3.8 million mt in 1963. The declines are attributable in large measure to the regime's initial emphasis on crop diversification and industrialization.

In 1962 the policy pendulum swung back to sugar production as a result of which large areas of cane were replanted. Efforts are continuing to plant more cane and to cultivate more thoroughly the acreage previously planted. The effects of these efforts should become apparent in the 1964 harvest, and sugar production is likely to show at least a modest increase over the 1963 level.

Cuban agriculture -- in particular, cane sugar production -- is characterized by extensive methods of cultivation. Land is abundant and relatively fertile. Very little previously has been done in the nature of crop rotating, fertilizing, irrigating, soil conservation, and soil reclamation. As a result, yields per unit area of land are relatively low in Cuba. The Castro regime is striving for a more intensive system of agricultural production in an effort to relieve the strain on the transportation and distribution systems and to reduce labor requirements for agricultural harvesting. The regime is stressing irrigation, a greater use of fertilizers, the utilization of more productive varieties of plants, and the mechanization of crop planting, cultivating, and harvesting operations.

II. Imports

a. Foods and Fibers

Cuba imports approximately 40 percent of the total number of calories consumed in the country. All of the wheat, half of the rice, and almost all of the fats and oils consumed in Cuba are imported. Denial of this food would have severe adverse effects on the economy, but the Bloc at present is supplying Cuba with the great bulk of its food imports, although some rice is obtained from several free world countries including Chile, Uruguay, and Egypt.

Cuba is attempting to become self-sufficient in cotton production but one obstacle to complete self-sufficiency has been lack of manpower for harvesting the crop. Although the harvest of the last cotton crop was extended over seven months, only 70 percent of the total crop could be harvested with the available manpower. To relieve this shortage Cuba plans to use ten cotton combines obtained from the Soviet Union for the next cotton crop, which will be harvested starting in November. Cuba still relies on imports for about 75 percent of raw cotton requirements. Denial of raw cotton would have serious effects on the Cuban economy, but the USSR has been supplying Cuba with its cotton import requirements in spite of a tight domestic supply situation.

b. Machinery

To overcome a severe labor shortage in Cuban agriculture, the regime is attempting to mechanize agricultural activities, in particular

harvesting operations. During the 1962 sugar harvest the regime experimented with cane-cutting and cane-loading machines and was favorably impressed with the contribution made by the latter. Accordingly, Cuba has arranged to obtain 3,500 cane-loading attachments and 1,000 tractors from the Soviet Union for use in the 1964 harvest. Although the cane-cutting machines used in the next harvest may be of some help, the bulk of the cane again will have to be cut by hand; cane-cutting is an operation which has not yet satisfactorily lent itself to mechanization. Denial to the Cubans of cane-cutting and cane-loading machines from Free World countries would delay solution of Cuba's manpower problem in this industry.

Cuba presently has the capacity to mill considerably more sugar cane than the country produces and should be able, through improvisation and cannibalization, to keep enough mills grinding to process the cane crop in the next two or three years. In the long run, however, as the mills deteriorate and if plans to increase cane production are realized, Cuba will be forced to rely on outside sources for mill equipment.

Cuban rice production is probably more heavily mechanized than the production of any other crop. Rice combines are used to harvest the crop and airplanes are used to spray insecticide on the growing crop. Rice combines and crop dusting planes are being supplied by the Bloc but the fact that last year the Cubans were forced to cut a portion of the crop by hand indicates that the optimum quantity of harvesting machinery is not yet available.

Cuba is making an effort to expand the area under irrigation and is also attempting to drain swamp lands. For both of these purposes pumps will be required. With adequate irrigation facilities Cuban agricultural production could be increased significantly inasmuch as rainfall during the dry half of the year is only about one-third the amount of rainfall during the wet half of the year. With sufficient irrigation facilities Cuba could spread out its crop production over the whole year instead of concentrating production during the six-month wet season. At the present time, the Bloc is making a substantial effort in terms of technical assistance and equipment to meet Cuba's needs for irrigation facilities.

c. Materials

Most of Cuba's sugar is exported in jute bags. The bags weigh about 2.5 pounds each and carry about 250 pounds of raw sugar. Cuba obtains its jute bags from India and Pakistan (about 40,000,000 annually, which represent only a fraction of India's and Pakistan's output). India and Pakistan produce about 95 percent of the jute bagging in the world, with most of the rest being produced in Communist China, Taiwan, and Brazil. Communist China and Taiwan are net importers of jute while Brazil usually exports negligible quantities. Cuba then is entirely dependent on India and Pakistan for its jute bagging needs. In order to diminish this dependence on foreign sources of bagging Cuba is attempting bulk handling of sugar and plans to use a domestically-produced fiber, kenaf, to make sugar bags. However, at present Cuba has only two bulk loading terminals -- Cienfuegos and Matanzas -- and only a small part

of the sugar is exported in bulk. The plant to produce kenaf sugar bags is not yet in operation and it probably will be several years before Cuba is able to supply a significant number of domestically produced sugar bags. Inasmuch as Cuba almost certainly can satisfy its requirements for jute bagging through third countries, the denial to Cuba of bagging from India and Pakistan is unlikely to prevent Cuba from obtaining such bagging. Short of absolute denial, delay on the part of the companies in India and Pakistan in delivering the jute also might have serious adverse consequences for Cuba. Cuba usually negotiates its supplies of jute in July and August for the bags to be used in the harvest which occurs from late January to early June the following year. If the delivery of jute bagging were delayed until sometime later in the harvest, the adverse effects on the sugar industry could be serious, since Cuba has only very limited bulk storage facilities.

Before the Castro regime assumed power, Cuba applied annually about 275,000 mt of fertilizer to its crop land, primarily to cane, rice, and tobacco fields. To support its agricultural intensification policy, the regime expects to apply about three times this amount every year. Almost all of Cuba's fertilizer has been imported, largely from the USSR. However, the USSR also is stressing fertilizer application and, although it presently is enlarging fertilizer production capacity, a requirement to supply substantial additional quantities to Cuba would place some strain on Soviet supplies. The impact on Cuban agriculture of a denial of fertilizer

is problematical, however, inasmuch as various reports indicate that fertilizer frequently is not applied properly. (See Appendix C for additional discussion of fertilizers.)

Use of insecticides in Cuba probably is more important for rice and cotton than for most other crops. The Bloc appears to be supplying Cuba with much of its insecticide requirements, although the quality may not be as high as in those formerly obtained from the US. (See Appendix C, above, for additional discussion of insecticides.)

d. Livestock

During the first years of the revolution the slaughter of cattle and pigs was carried on at an abnormally high rate. An especially harmful practice was the slaughtering of some of the best breeding stock. As a consequence, the livestock population at present is barely equal to that existing at the beginning of the revolution, in spite of rigorous restrictions placed on the slaughter of livestock during the last two years. Castro has called cattle the second pillar of the Cuban economy, ranking only below sugar cane. Apart from controls on slaughtering, the effort to build up livestock herds is being augmented by adaption of artificial insemination techniques and the importation of livestock from abroad. In 1962, Cuba imported from Canada about 4,600 head of cattle, about 4,000 sheep, about 1,500 pigs, and thousands of chickens. Although the numbers of cattle imported from Canada are small compared to the approximately 6,000,000 head of cattle in Cuba, the cumulative effect of the importation of thousands of high quality breeding cattle could be substantial over the years.

III. Conclusion

Except for jute bagging, there appears to be no item obtained from Western sources denial of which would have serious effect on the Cuban economy. The Bloc appears able to furnish Cuba with its basic requirements for the import of food, machinery, and raw materials. The denial of jute would have a serious impact on the export of sugar, but in view of the great supply of jute in the world, and especially in Pakistan and India, the two main suppliers, the possibility of a successful denial program seems remote.